Claims

1. A method of tracking attitude of a device comprising
the steps of:

fixing a two-dimensional array of photosensors
to said device;

5   attaching an optical means to said device to
image features of an environment onto said photosensors;

utilizing said two-dimensional array to acquire
a first image of features within a field of view of said
array;

10   storing said first image;

utilizing said two-dimensional array to acquire
a second image of features within said field of view at a
time subsequent to acquiring said first image, said first
and second images being images of regions that are
15 largely overlapping such that there are features common
to both of said first and second images;

correlating said first and second images to
detect differences in location of said common features
within said first and second images; and
20   based upon said step of correlating, forming an
attitudinal signal indicative of any changes in angular
orientation of said device during an interval between
acquiring said first and second images.

2. The method of claim 1 further comprising a step of
controlling location of a cursor on a display screen in
response to said attitudinal signal.

3. The method of claim 2 wherein said step of control-
ling location of said cursor includes transmitting said
attitudinal signal from said device to a remote receiver
in a wireless manner.

4. The method of claim 1 wherein said step of fixing said two-dimensional array is a step of attaching said array to a hand-holdable member.

5. The method of claim 1 wherein said step in which said first image is acquired is a step including defining a reference frame for correlation with a sequence of sample frames for determining said changes in angular orientation.

6. The method of claim 1 further comprising nominally focusing said photoelements at infinity.

7. The method of claim 3 wherein said steps that include acquiring first and second images are steps of forming image data of a region of an environment in which said display screen resides.

8. The method of claim 7 further comprising periodically acquiring sample images and correlating each sample image to an earlier acquired image to detect differences in location of said common features within said sample images.

9. A system for tracking attitude comprising:

     a housing;

     a two-dimensional array of photosensors fixed to said housing for forming images of features;

5   storage means connected to said array for storing a reference frame of pixel values in which each pixel value is indicative of light energy received at a particular photosensor at a specific time;

     correlation means connected to said array and
10 to said storage means for correlating an arrangement of said pixel values of said reference frame with at least one sample frame of pixel values formed in response to light energy received at said array subsequent to said specific time; and

15   computing means, responsive to detection of correlations by said correlation means, for generating an attitudinal signal representing pitch and yaw of pixel values of said at least one sample frame relative to said pixel values of said reference frame, said attitudinal
20 signal thereby representing pitch and yaw of said housing.

10. The system of claim 9 wherein said housing is hand holdable.

11. The system of claim 10 further comprising a video display and a demodulator means connected to receive said attitudinal signal for forming a cursor-control signal for maneuvering a cursor of said video display.

12. The system of claim 11 further comprising transmission means connected for wirelessly transmitting said cursor-control signal to said video display.

13. The system of claim 9 further comprising optical means for nominally focusing said array at infinity, said array having arcuate edges having curvatures selected to compensate for distortions induced by said optical means.

14. A method of controlling movement of a cursor of a video display comprising steps of:

      providing a hand-holdable device having a two-dimensional array of photosensors;

5   tracking movement of said device relative to a region of an environment in which said device resides, including substeps of:

      (a) periodically forming largely overlapping images of a field of view of said array;

10   (b) storing a first image as a reference image;

      (c) correlating said images such that changes in location of characteristics of said region within successive images are computationally recognized;

15   in response to said substeps (a), (b) and (c), forming a cursor-control signal that corresponds to computational recognition of said changes in location; and

      transmitting said cursor-control signal to said

20   video display.

15. The method of claim 14 wherein said substep of correlating is a step including forming an attitudinal signal representative of pitch and yaw of said hand-holdable device.

16. The method of claim 14 wherein said step of transmitting said cursor-control signal includes transmitting said signal in a wireless manner to said video display.

17. An arrangement of a sensor and optics comprising:

an array of photosensors; and

a lens system for providing a focus for imaging
by said array, said lens system having a characteristic
5   of introducing curvilinear distortion of an image to said
array;

said array having a shape to achieve compensa-
tion of said curvilinear distortion, including having
arcuate edges to establish said compensation.

18. The arrangement of claim 17 wherein said photo-
sensors are disposed in a plurality of columns and a
plurality of rows and wherein said photosensors combine
to define an optical axis for said array, adjacent
5   columns being spaced apart by an arcuate boundary, with
radii of curvature of said arcuate boundaries increasing
with departure from said optical axis.

19. The arrangement of claim 18 wherein adjacent rows
are spaced apart by second arcuate boundaries, with radii
of curvature of said second arcuate boundaries increasing
with departure from said optical axis.